

REMARKS

Claims 1-4, 8-12, 16-17 and 21-27 are pending in the application with the present amendments. In the Office Action, all claims were rejected over U.S. Patent Publication No. 2005/0020076 to Lee et al. ("*Lee*"), or U.S. Patent Publication No. 2004/0043526 to Ying et al. ("*Ying*"). For the reasons set forth below, applicants respectfully submit that the presently pending claims are fully distinguished from *Lee* and *Ying*. Reconsideration and withdrawal of the rejections is respectfully requested in view of the amendments and remarks presented herein.

As amended herein, claim 1 recites a method of patterning a magnetic tunnel junction (MTJ) stack in which a *conductive* hard mask is formed to overlie an area of the MTJ stack. The hard mask is used during a step of inactivating a second area of the free layer exposed by the hard mask. In addition, a conductive line is formed which contacts the hard mask, the hard mask conductively interconnecting the MTJ stack to the conductive line. This amendment to claim 1, is supported, for example, by paragraph [0026] of the Specification and FIG. 1.

Clearly, such method is neither taught, nor suggested by *Ying* and *Lee* used in the Office Action for rejecting the claims. Neither *Ying* nor *Lee* teaches or suggests using a conductive hard mask. *Lee* does not specify the hard mask material (paragraphs [0014], [0031] and [0032]) and *Ying* merely describes using a sacrificial material such as silicon dioxide as the hard mask (paragraphs [0023] and [0025]). Neither reference describes

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forming a conductive line in contact with the hard mask, and using the hard mask to conductively interconnect the MTJ stack to the conductive line.

Moreover, the features of amended claims 9, 16 and 17 are believed to further distinguish the invention recited therein from the cited art, as well as claims 21-27. With respect to claims 23 and 24, the cited art neither teaches nor suggests a tunnel barrier layer including magnesium oxide or a method in which the process of rendering the free layer inactive forms a moisture barrier for protecting the tunnel barrier including magnesium oxide.

In addition, the cited art neither teaches nor suggests the specific features of the invention as recited in claims 25-27 in which the free layer includes particular material such as NiCoFe, or which includes boron, the boron leading to the formation of a region having glassy oxidized phase.

Finally, applicants disagree with the Examiner's conclusions regarding claim 11 and submit that prima facie obviousness has not been established, the Office Action not having established a teaching of prior art of using anodization to electrically and magnetically inactivate a thin film layer such as a free layer of an MTJ stack by techniques compatible with MTJ stack patterning.


Support for the present amendments is provided, *inter alia*, at paragraphs [0026], [0029], [0030] and [0031] of the Specification and in the Figures.

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It is believed that no fees are required upon filing this Amendment. However, if any fees are required, authorization is given to debit the Deposit Account No. 09-0458 of the Assignee International Business Machines Corporation. If there is an overpayment, please credit the same account.

Respectfully submitted,
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